

REMARKS

By this amendment, Applicants have amended the claims to more clearly define their invention. In particular, claim 1 has been amended to recite that the sheath flow forming block includes a plurality nozzles arranged therein. The phrase, “a plurality of inlet ports” has been amended to read “a first inlet port”; the first inlet port is one through which a first fluid of the two fluids flows into the sheath flow forming block. Claim 1 has also been amended to recite the presence of a plurality of second inlet ports, each of which is opened to one of the nozzles inside the sheath flow forming block and through which a second fluid of the two fluids flows into the sheath flow forming block. Claim 1 has also been amended to recite that the sheath flow forming block is configured such that the two fluids led through the first inlet port and the second inlet ports into the sheath flow forming block are made into the sheath flows alternatively arranged in a direction perpendicular to the flow direction. These amendments are supported by, e.g., Figures 1-3 and 7 and the description thereof in Applicants specification. Claim 12 has been amended to eliminate the indefiniteness problem noted by the Examiner in numbered section 3 of the Office Action. Claims 2 and 15-18 have been canceled without prejudice or disclaimer.

In view of the foregoing amendments to claim 12 and the cancellation of claim 15, it is submitted all the claims now in the application comply with the requirements of 35 U.S.C. 112, second paragraph. Therefore, reconsideration and withdrawal of the rejection of claims 12 and 15 under 35 U.S.C. 112, second paragraph, are requested.

Claims 1-18 stand rejected under 35 U.S.C. 102(e) as allegedly being anticipated by U.S. Patent No. 7,129,091 to Ismagilov et al. Applicants traverse this rejection and request reconsideration thereof.

The present invention relates to a chemical reactor, shown by way of example only in the figures with reference numeral 50. The chemical reactor includes a sheath flow forming block 10 including a plurality of nozzles 5 arranged therein. The sheath flow forming block forms multiple sheath flows 61, 62 with two fluids that do not mix with each other. A first inlet port 2 is provided through which a first fluid of the two fluids flows into the sheath flow forming block 10. A plurality of second inlet ports 1 are provided, each opened to one of the nozzles 5 inside the sheath flow forming block 10 so that a second fluid of the two fluids flows into the sheath flow forming block 10 through the second inlet ports 1. A contraction zone 11 is provided to simultaneously contract the multiple sheath flows 61, 62 formed in the sheath flow forming block. A reaction flow channel 22 is connected with the contraction zone 11 and is smaller in width than the sheath flow forming block 10. See, by way of example only, Figures 1-3.

The patent to Ismagilov et al. discloses a device and method for pressure-driven plug transport and reaction. The Office Action refers to Figures 5, 6 and 19 of Ismagilov et al.

However, Ismagilov et al. does not teach a plurality of second inlet ports 1 open to the sheath flow forming block 10; more specifically, the Ismagilov et al. patent does not disclose a sheath flow forming block that includes a plurality of nozzles arranged in its inside such that each of the

second inlet ports is open to each of the nozzles and that the sheath flow forming block is configured such that the sheath flows and are alternately arranged in a direction perpendicular to the flow direction.

Ismagilov et al. discloses a plurality of second inlet ports (e.g., inlet ports 501, 503, 505 and 507 for introducing the four reagents A, B, C and D, and inlet ports 502, 504, 506 and 508 for introducing aqueous streams in Fig. 5). However, in Ismagilov et al., the plurality of second inlet ports 501-508 are disposed outside a channel 500 (apparently what the Examiner equates to a sheath flow forming block), and the fluids, which introduced through the plurality of second inlet ports 501-508, are introduced through one inlet port into the channel 500 as a second fluid.

On the contrary, according to the present invention, as shown by way of example only in the figures, the plurality of second inlet ports 1 are disposed inside the sheath flow forming block 10, and the second fluid is introduced through the plurality of second inlet ports into the sheath flow forming block 10 and the forms a plurality of parallel flows. According to the present invention, the time of reaction between liquids which do not mix with each other is substantially shortened. Hence, a smaller reaction container may be used and the minimum required volume of liquids for reaction is reduced. Such is not disclosed by Ismagilov et al.

Further, in the sheath flow forming block 10 according to the present invention, several nozzles 5 are located in a flow channel to form multiple sheath flows. This makes it possible to decrease the number of flow channels with small sectional areas or decrease their length, which minimizes loss in the

pressure to let liquids flow and makes it easy to manufacture the chemical reactor 50 according to the present invention. This is also not disclosed by Ismagilov et al.

For the foregoing reasons, the Ismagilov et al. patent does not anticipate the presently claimed invention.

Applicants note the Examiner has cited a number of documents as being pertinent to applicants' disclosure. However, since none of these documents has been applied in rejecting the claims formerly in the application, further discussion of these documents is deemed unnecessary.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all the claims now in the application are requested.

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Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

/Alan E. Schiavelli/

Alan E. Schiavelli

Registration No. 32,087

(703) 312-6600